DFSC

# FUEL LINE

APRIL-JUNE 1984

DEFENSE FUEL SUPPLY CENTER ● CAMERON STATION ● ALEXANDRIA, VIRGINIA

## INSIDE:

## GRENADA

*82nd Airborne officer discusses operations with Caribbean peaceforce soldiers.*

DFSC

# Fuel Line

A DEFENSE FUEL SUPPLY CENTER
TECHNICAL PUBLICATION

April-June 1984

*FUEL LINE is an official publication, published quarterly by and for the Defense Fuel Supply Center and fuel-oriented clientele. FUEL LINE is designed to provide timely, factual information on policies, plans, operations and technical developments of the Defense Fuel Supply Center and other interrelated subject matter. Views and opinions expressed in FUEL LINE are not necessarily those of the Department of Defense. Submissions and inquiries should be addressed to: Defense Fuel Supply Center, Editor, FUEL LINE, Public Affairs Office (DFSC AP), Cameron Station, Alexandria, Virginia 22314. Telephone: (202) 274-6489.*

*Major photographic services are provided by the Defense Logistics Agency, Administrative Support Center, Technical Presentations Division.*

Rear Admiral William J. Ryan
SC, USN
*Commander,*
*Defense Fuel Supply Center*

Colonel Larry E. Bower, USAF
*Deputy Commander,*
*Defense Fuel Supply Center*

Donald J. Peters
*Public Affairs Officer*

Linda M. Stacy-Nichols
*Editor*

# Grenada: The Defense Fuel Supply Center's Watchwords were Efficiency and Economy

**by Linda Stacy-Nichols**

The Army officer recalls that it was very early in the morning of October 25 when the telephone rang in his home. The Defense Logistics Agency duty officer was on the line, and what he said made the major hurry to his office at the Defense Fuel Supply Center (DFSC).

He was told the commander of division support to the 82nd Airborne needed to speak to him on a secure line.

In just a few hours, soldiers of the 82nd Airborne Division, based at Fort Bragg, North Carolina, would deploy to Grenada, a tiny Caribbean island which served as the temporary home for some 600 students attending St. George's University. The mission to evacuate these students (along with some British nationals) also involved Black Hawk helicopters which were flying to the island. Scheduled to arrive in late afternoon on the first day of the mission, they would need fuel immediately thereafter.

The question posed by the division support commander was simple: "What kind of fuel supplies are available to fulfill our needs?"

As chief of the Inventory Control and Tanker Distribution Division within DFSC's Supply Operations Directorate, the Army major's task was not as simple. In conjunction with his immediate supervisor, a small number of other DFSC personnel, petroleum officers of the 82nd Airborne Division, and petroleum personnel assigned to the Commander in Chief, Atlantic Fleet, (CINCLANTFLT), an orderly plan to meet the mission's requirements was forged.

A three-step proposal emerged from the exchange with transition to each phase dependent on the time required to complete the activity in Grenada.

The first phase, born from a need to provide immediate support, involved the use of C-130's, nicknamed "bladder birds" because they are each equipped with two 6,000-gallon collapsible fuel bags. The containers were filled at a Defense Fuel Supply Point located at Roosevelt Roads, Puerto Rico. The plan called for fuel to be loaded from the bladder birds into airplanes and Army storage vehicles.

Building on the first phase, step two of the plan supplemented the use of C-130s with local purchases from suppliers already in business in Grenada.

If it became evident that the mission would remain active for more than 30 days, phase three would be implemented: a contract to provide jet fuel, motor gasoline and diesel fuel to U.S. forces would be negotiated. (Airlift support was provided by an already existing contract with a supplier in Barbados.)

While U.S. soldiers occupied Grenada, DFSC employees were engrossed in purchase orders and contracts. On November 4, a Friday, the DFSC Contracting and Production Directorate received a purchase order request from the Requirements branch of the Directorate of Supply Operations. CINCLANTFLT had determined that American forces would require more than a 30-day fuel supply.

A contract was negotiated in record time. Solicitations were sent out on the day the purchase order was received, bids were due back 4 days later, and an award was made on November 10.

"Throughout the contract negotiations it was our responsibility to ensure a competitive bidding process," commented Malinda Battle, the procurement agent who was assigned the responsibility for obtaining the fuel.

The negotiations and subsequent contract were not without complications—complications which brought other DFSC elements to the forefront.

There were logistical difficulties in arranging for the fuel testing, a problem resolved by the Technical Operations Directorate in close cooperation with the military services involved. The Office of Counsel helped to confirm that the U.S. government would be exempt from Grenadian taxes for the fuel purchases.

Consonant with phase two of the original three-part plan, U.S. soldiers


had become accustomed to dealing with a particular fuel supplier who was chosen at the beginning of the operation. When the contract was awarded, however, a different supplier ironically won out with a lower bid. The troops adapted to the new supplier, who served them very well.

To offset any possibility that fuel estimates were too high, DFSC negotiated a 25 percent minimum lift clause which allowed for purchase of as little as one-quarter of the product stipulated in the contract.

When Grenada began to receive international attention, Malinda Battle reports that she felt just a bit excited. If someone walked into the room and said "Grenada," a hush would fall and all eyes would turn to Ms. Battle and the supervisory contracting officer, Ola Lee.

But before the mission began, in the early morning hours of October 25, the officer in the Supply Operations Directorate could discuss Grenada only with his supervisor and the DFSC deputy commander.

Other employees in the directorate arrived for work that morning not suspecting that the major had been there for several hours already.

Did he ever wonder, in those early

*82nd Airborne soldiers engage in operations in Grenada. The U.S., Jamaica, and Barbados, as well as six nations of the Organization of Eastern Caribbean States made up the multinational force.*

*An 82nd Airborne trooper with American medical students. Soldiers rescued 622 students from the True Blue campus of St. George's University School of Medicine.*

hours before the purpose of the mission was clear, why American forces were deploying to Grenada?

"No," he said, "We're requirements-oriented here. The rest is superfluous."

Two days later, 622 American students were safely home, flown on C-141s fueled by DFSC. FL

# DFSC Environmental Program Controls Fuel Farm Hazards

by Chuck Williams

**CAUTION**
**HAZARDOUS**

Whoa, wait a minute. Sit back down. Don't go bolting for the nearest doorway. Almost everyone knows that fuel storage tank farms are potentially explosive by virtue of their containment of hundreds of thousands, or even millions of gallons of highly flammable materials. This hazard is inherent in *all* fuel farms, including the 16 government-owned contractor-operated (GOCO) tank farms over which the Defense Fuel Supply Center exercises managerial and administrative control. In terms of these possible dangers, DFSC fuel farms are relatively very safe.

So what is the big deal? There's really nothing new about the hazards of fuel farms—or is there?

Yes, there is a new concern, one which is adjunctive to the common perils of fuel storage. It is environmentally predicated and has nothing to do with potential explosions. This new issue involves wastes which are generated and must be disposed of every time a tank is emptied and its interior cleaned. According to Environmental Protection Agency (EPA) regulations (40 CER Parts 260-265), the wastes which are produced as a result of tank cleanings are in almost every case characterized as hazardous. Because of this designation, this by-product now falls under strict regulatory scrutiny regarding its handling and disposal. Fuel and fuel wastes are also the object of much public attention because of reports of such materials found in neighborhood drinking supplies, and other "close-to-home" locations throughout the country.

There are numerous fuel tanks scattered nationwide which are under DFSC's domain. These tanks represent some 11 million barrels (462 million gallons) of storage. Although tanks normally need cleaning only once every few years, DFSC typically oversees several tank cleanings annually because of its extensive holdings. Each of these cleanings, depending upon the method used, can generate several thousand gallons of "EPA-deemed" hazardous wastes which require disposal.

Compliance with the EPA regulations, though not an overly complicated task, can become difficult simply because tank cleanings must be monitored at fuel farms nationwide while

*"DFSC is striving to keep abreast of each state's requirements as they evolve, and to comply with the EPA mandates where state authority has not yet been approved."*

the program is administered from Cameron Station. Coordination is further complicated by the number and variety of responsible parties involved in each tank cleaning and waste disposal operation.

Adherence to hazardous waste regulations becomes even more difficult as EPA continues its transfer of hazardous waste management regulatory responsibility to individual states. Most states will eventually be qualified to implement their own individual regulations, many with different qualifying criteria and reporting requirements. Although the states will be required to have programs at least as stringent as EPA's, in most cases, they will be stricter. DFSC is striving to keep abreast of each state's requirements as they evolve, and to comply with the EPA mandates where state authority has not yet been approved.

As a result of these relatively recent EPA requirements, DFSC's Environmental Quality Division (DFSC-FQ) has developed a program to ensure that all hazardous waste regulations are complied with at all of GOCO fuel farms or Defense Fuel Support Points (DFSPs). This plan, dubbed the DFSC Hazardous Waste Compliance Program, is currently being implemented by incorporating hazardous waste compliance language in all of the terminal operating contracts and tank cleaning contracts. Consonant with the transition from federal to state responsibility for environmental authority, the DFSC Hazardous Waste Compliance Program has been designed to comply with the most stringent regulatory requirements, whether derived from local or national legislation.

In the past, it was common practice at most fuel storage tank farms to dump wastes in a pit, usually inside of the diked tank basin. This is now strictly forbidden by all regulations. In fact, none of the waste may be stored, buried or burned anywhere at the tank farm, but must be removed and properly disposed of or stored off-site as soon as the tank is cleaned.

Oddly enough, fuel storage sludge is not one of the several hundred EPA "listed" hazardous wastes. It does, however, fall under the category of exhibiting a hazardous characteristic and therefore must be regulated as if it were specifically listed.

In most cases this crucial qualifying characteristic is "ignitability." This is especially true for sludges which result from the storage of jet fuel, motor gasoline (MOGAS), aviation gasoline (AVGAS), and other highly-volatile, low flash-point fuels. The regulations specify that any item for disposal which exhibits a flash point of below 60 degrees C/140 F is termed hazardous due to ignitability. The procedure to test this standard employs a closed container which actually tests the vapor above the liquid waste sample rather than the liquid itself. Therefore, regardless of how much water might be mixed with the fuel-impregnated sludge (which is often the result with certain cleaning methods), the sample will almost always still test ignitable.

The other characteristics for which fuel sludge must be tested is toxicity, formerly termed "EP toxicity." On this basis, lead is the one item for which some fuel sludges may qualify as hazardous. Of course the vast majority of DFSC products are unleaded. Consequently, their associated sludges normally test negative for EP toxicity due to lead content. The test must be administered, nevertheless, because both MOGAS and AVGAS are often leaded. Also, although any given tank may currently be used for unleaded fuel service, the sludge sometimes contains significant lead concentrations due to past storage of other products.

Generally, DFSC's Hazardous Waste Compliance Program is very simple. There are actually only four major requirements for which DFSC is responsible at each DFSP fuel farm: lab test all wastes for disposal, ensure that no wastes are stored at a DFSP for more than 90 days, provide hazardous waste manifesting for each waste

*"The new program easily and simply provides much-needed continuity . . . and will help ensure a cleaner and healthier environment."*

shipment which leaves a DFSP, and file periodic reports with either EPA or the respective state.

Briefly, the DFSC program comprises the following requirements:

- As a generator of hazardous wastes, each DFSP must have an EPA-assigned hazardous waste generator identification number. These numbers have been assigned and coordinated with each GOCO DFSP and appropriate Defense Fuel Region (DFR).
- Tank bottom sludge to be removed and disposed of must be lab tested *before* the tank cleaning procedure begins. The waste can then be classified as either hazardous or non-hazardous. Non-hazardous waste is, of course, exempt from this program. Additionally, if the waste is to be taken with the contaminated fuel to a recycling facility for reclamation, nothing is required except a statement from the tank cleaning contractor that all wastes will be recycled. This statement must be signed and dated, and include appropriate quantities, transporters, dates, EPA identification numbers and the name of the reclamation facility. Of course to qualify for this exemption, *all* wastes must be included in the shipment to the recycling center. The DFSP terminal operating contractor simply collects the lab test results (and the statement, as applicable), and gives them to the DFR Quality Surveillance Representative (DFR/QSR) who in turn submits them to DFSC-FQ.
- No waste may be stored at a DFSP for more than 90 days. This means that once the tank cleaning operation has commenced, all wastes must be shipped off-site to either an approved disposal facility or reclamation center in less than 90 days. Otherwise, the DFSP can be classified as a treatment, storage and disposal facility and be subjected to a host of other comprehensive and complex regulatory requirements.
- Tank bottom sludge which is to be removed and disposed of must be tracked from "cradle to grave." This includes *all* by-products of the cleaning process (sludge, dirt, rust, bottom water, wash water, etc.) and in fact applies not only to the tank cleaning process, but to anything at a DFSP which has been characterized as hazardous and requires disposal. This tracking is accomplished by use of a hazardous waste manifest which tracks each shipment from the DFSP. This system provides for the signatures of each party who handles the waste from the generator (verified and signed by the QSR) to the disposal site, and any and all transporters involved. Since the manifest contains all of the data required for DFSC-FQ to submit the required reports, the terminal operating contractor simply leaves the terminal and gives it and the lab results to the DFR/QSR. It is then routed to DFSC-FQ.

Although the tank cleaning contractors are the parties involved in the actual hazardous waste operations, DFSC bears the onus for reporting to the EPA or individual states. The exact quantity and type of hazardous waste must be included in these reports, as well as dates involved, transporters used, and destinations of each waste shipment.

The new compliance program has integrated the scattered facets of responsibility vested in the Directorate of Facilities Management, the Directorate of Contracting and Production, the Defense Fuel Regions, the resident QSRs, terminal operating contractors, military service contract administrators, tank cleaning contractors and transporters. The new program easily and simply provides much-needed continuity and, when fully operational, will eliminate past problems and ensure compliance with the law. More importantly, DFSC's commitment to the spirit and letter of hazardous waste regulations will help ensure a cleaner and healthier environment. **FL**

---

*CHUCK WILLIAMS was with DFSC for nearly 2½ years. He has left his post as the environmental impact officer in the Directorate of Facilities Management to return to his home state of Alabama, where he has accepted a position in the Office of Surface Mining.*

---

# There's More to "Cooking" Oil than Sweet 'n' Sour

*A short course from the land down under which provides some interesting details on fractions, splitters, and "Siamese twins."*

Imagine a soft-serve ice cream machine dispensing milk chocolate flavor. It emerges from the nozzle in a thick, firmish brown rope before the operator twists it neatly into a cone. Crude oil from the new Jackson oil field in Queenslands' far south-west (Australia) looks like that—but it's somewhat less toothsome.

Not so gooey as Jackson oil are the various crude oils found in Bass Strait, Australia. Barrow Island crude is different again, and so on. There are a wide range of different crude oils which are made use of in Australia. Their colors span the spectrum, almost. They vary from thick to thin. Crudes differ, from field to field; sometimes, as in the Cooper and elsewhere, they even differ in the same well.

Crude oil, straight from the well, is not especially useful as it is, except for producing income for its owners, taxes for governments—and for turning into petroleum products. The complex processing needed is the role of the oil refinery.

Its fundamental stages are to:

- Separate
- Convert
- Purify

What products an oil refinery can produce depend, to a considerable extent, on the composition of the crude it processes. A Bass (sweet) crude, for example, may yield up to 55 percent gasoline for every barrel, and only 5 percent fuel oil. An Arab light (sour) on the other hand, could yield up to 30 percent gasoline and four times as much fuel oil as a barrel of Bass. The Arab light would also lend itself to the manufacture of lubricant products, while the Bass is more suited to other uses. (A barrel is the oil industry's standard international unit of volume—42 American gallons, 35 Imperial gallons, or 159 liters.)

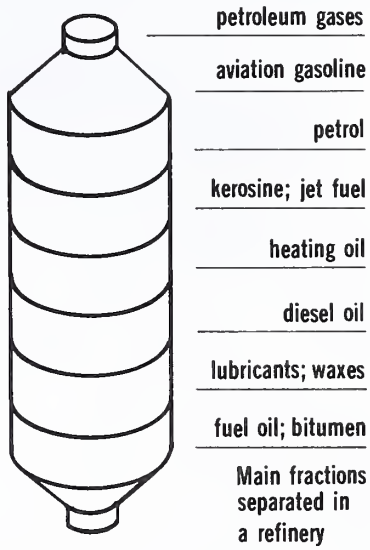
The oil which arrives at a refinery, by tanker, pipeline, or truck, may contain some impurities, such as sulphur. (An oil with little sulphur is said to be sweet; one with lots, sour.) These impurities take a lot of applied chemistry—and plumbing—to remove. This purifying takes place at various stages: before refining, during intermediate processes and even at final product stage. As a result, many contaminants, from smelly gases to gums which could cause engine problems, are removed in environmentally sound ways.

But most of the liquid comprises a bewildering mixture of molecules of carbon and hydrogen atoms, known collectively as hydrocarbons. They have the general formula $C_nH_x$. The simplest is methane $CH_4$ (i.e., four hydrogen atoms are attached to one carbon atom). One of the more complicated hydrocarbons has 174 carbon atoms. These various hydrocarbons have varying structures, ranging from tetrahedrons to rings with many long branches of atoms attached. The more atoms in a molecule, the heavier it is.

Some crude oils—such as those from Bass Strait—have high proportions of light molecules. They don't produce heavy products, such as bitumin. Arab light oil, on the other hand, has enough heavy molecules of the right type to produce lubricating oils and some bitumin.

## FIRST, BOIL YOUR OIL

The basic process in oil refining is distillation. Just as when the water is boiled, it turns to vapor (steam), so does oil change when heated. The lightest hydrocarbon molecules boil off first, at the lowest temperatures because their simple structures need less heat to change state. The more complicated (and therefore heavier) molecules need more heat and so have higher boiling points. But, equally, vapors condense back to liquids as they lose their acquired heat energy by cooling. They condense in reverse order to which they boiled. This is the principle of distillation.



Main fractions separated in a refinery

Some of the tallest, biggest towers in a refinery are the distillation columns. These make use of the additional fact that hydrocarbons of roughly similar molecular weights vaporize at about the same temperature. Each such group is called a fraction or a cut, and distillation of oil is called fractionation. A distillation column or fractionation tower is a tall cylinder up to 45 meters high. It is divided into a series of interconnected chambers by trays perforated with short tubes. Each of the hundreds of tubed holes in a tray has a bubble cap above it.

These trays are placed at heights corresponding to the particular temperatures associated with the various fractions' condensation points. The lightest gas rises straight up through the maze of trays and bubble caps, finally passing out the top to be collected as *refinery gas* (used as refinery fuel). The next lightest group (used in *liquefied petroleum gas),* though, will cool enough by the time it reaches the tray top for the vapor to condense on the underside of the bubble caps and flow as liquid into the tray.

This process is repeated in all the various chamber levels down the tower. The result is that at the top trays, light gasolines (which are turned into commercial gasoline later on in the refinery) are the first liquids collected. Underneath, the slightly heavier *napthas* are condensed (but the gasolines are still vapor and bubble through the caps, the liquid napthas, and up to their own condensation level). Likewise, in descending order are collected the *kerosenes, basic distillates (diesel fuels), fuel oil,* etc. One product often mentioned in newspapers and books is gas oil. This is a basic distillate, an intermediate product which is used to produce *diesel fuels* (often just known as *distillates*).

At the base of the tower will be the heaviest materials, thick, viscuous heavy stuff, such as *bitumin* and *residue* or *residuum.*

Pipes collect each fraction in the tower and carry the separated fractions to different secondary processing units. At this stage, they are still basically feedstocks (base materials for further processing). Many of the fractions are redistilled to purify them or obtain more complex separation. The heavier residues are redistilled under vacuum to provide raw materials for lubricating oils, bitumin, and other feedstock for even more processing.

The earliest oil refining, about 125 years ago, only went as far as distilling kerosene, in high demand for lamps, stoves, and heaters, and similar applications as a substitute for whale oil. The rest was thrown away. It was decades before the invention of the internal combustion engine made production of gasoline necessary, for example. These days, there's a use for everything in a barrel of crude.

*"Final products for the market are, in most cases, blends of different hydrocarbons in closely controlled proportions put together in much the same way as a pharmaceutical chemist mixes various ingredients to fill a doctor's prescription."*

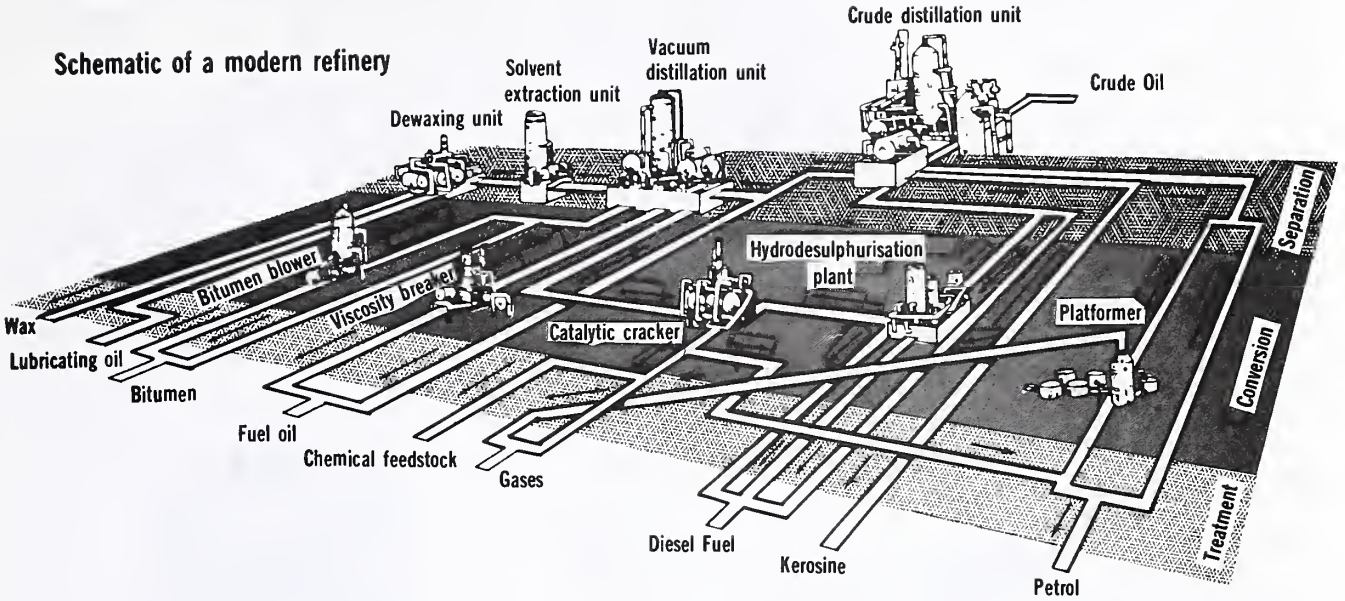
As uses have multiplied, so have refinery processes. Modern refinery technology goes far beyond mere separation of useful products. Starting in 1913, chemical engineers have progressively produced methods to change the relative yield of products. They do this by conversion of, or reshaping, hydrocarbon molecules. In a manner of speaking, a large part of refinery's output now comprises synthetic products.

In a typical refinery, perhaps more than half of the separated products are heavy fractions. However, increasingly, public demand is greatest for lighter fractions, particularly distillates and petrols. Chemists suggested that heavier molecules could be split and reassembled to make desired hydrocarbon products. Chemical engineers designed the processes to achieve this on commercial scales; engineers built the steel towers, pipes, pressure vessels and so on to do the job. Continual improvements are being made in what has become a major branch of applied science and technology.

Cracking molecules apart is the first stage. Heavy fractions are cracked into less complicated molecules by applying great heat. The heat breaks the bonds between groups of atoms at their weakest points. Smaller molecules are formed. This is called thermal cracking.

Then it was discovered that the introduction of a catalyst into certain cracking processes could achieve better results. A catalyst is a substance which assists in bringing about a chemical change without itself being changed fundamentally. In the oil industry, the processing is known as catalytic cracking, or catcracking for short.

For example, catcracking can convert heavier fractions into light, high-quality gasolines, or it can also turn




*"The earliest oil refining, about 125 years ago, only went as far as distilling kerosene, in high demand for lamps, stoves, and heaters and similar applications as a substitute for whale oil, the rest was thrown away."*

unwanted fuel oil into much-wanted diesel fuel. The trick with catcracking is knowing just how to crack which molecules so that they will produce the desired combination of carbon and hydrogen atoms. Chemists can determine in advance the particular conditions of temperature, pressure and catalysts to allow the cracking of specific groups of molecules to produce other specific molecules. It sounds fairly easy, but it isn't.

Cracking can produce hydrocarbons which are not present in crude oil. Careful tailoring of the new molecules produces chemicals which will have the right reactive properties to combine later in the refinery processes to produce the desired mix of final products, known as the refinery's product slate.

Generally, thermal cracking is used on heavy oils and residue. Catcracking is used on distilled products. One of the most used catalysts is a mixture of aluminum oxide and silica ground into a very fine powder. The catalyst flows like a liquid when kept agitated by steam, air, or other vapor and so mechanical handling is avoided inside the reaction vessel. The particles of the catalyst have a very large surface area—more than 600 square meters per gram—which facilitates the chemical reactions. The catalyst is made very hot, the hydrocarbons are vaporized and in the presence of the catalyst form new products. As the reaction proceeds, the catalyst particles become coated with carbon as a reaction by-product, and the catalyst becomes ineffective. So the catalyst is drawn off to a regenerator which burns off the unwanted carbon and returns the freshened catalyst for further use. There is a continuous cycle going on in the cracker.

A very expensive variation of catcracking is known as hydrocracking. This is catalytic cracking done in the presence of introduced hydrogen. This is a highly versatile process which gives high yields of superior gasoline as well as upgrading heavier oils into first-quality jet fuels and diesel fuels. Moreover, it can also turn unwanted light oils into LPG or petrochemical feedstocks.

## NEW GEOMETRY

Catalytic reforming is the most important conversion process. It is used by all refineries. It begins with the distillate boiling. This is then subjected to high pressures and temperatures in the presence of a platinum catalyst.

Many complex reactions take place. Some hydrogen and light hydrocarbon gases are produced. But the main product is a distillate of similar boiling range, with the vital difference that the geometry of most of its molecules has been rearranged.

The overall effect is an increase in octane rating from 40-50 to 80-100. The new molecules are known as isomers of the original molecules. A technical name for the new products is reformate.

## MORE CONVERSIONS

Another conversion process, called alkylation, really is the reverse of cracking. In alkylation, two dissimilar light hydrocarbons are made to combine, through the use of a catalyst. For example, addition of a molecule of butene to a molecule of isobutane in the presence of strong sulphuric acid produces a molecule of the much more complex hydrocarbon known as iso-octane, a valuable component of aviation gasoline for piston-engined aircraft.

## SIAMESE TWINS

An allied process is polymerization, which means combination of two or more identical molecules to form a more complex compound, which is a polymer of the basic molecule. Some polymers are chains thousands of units long.

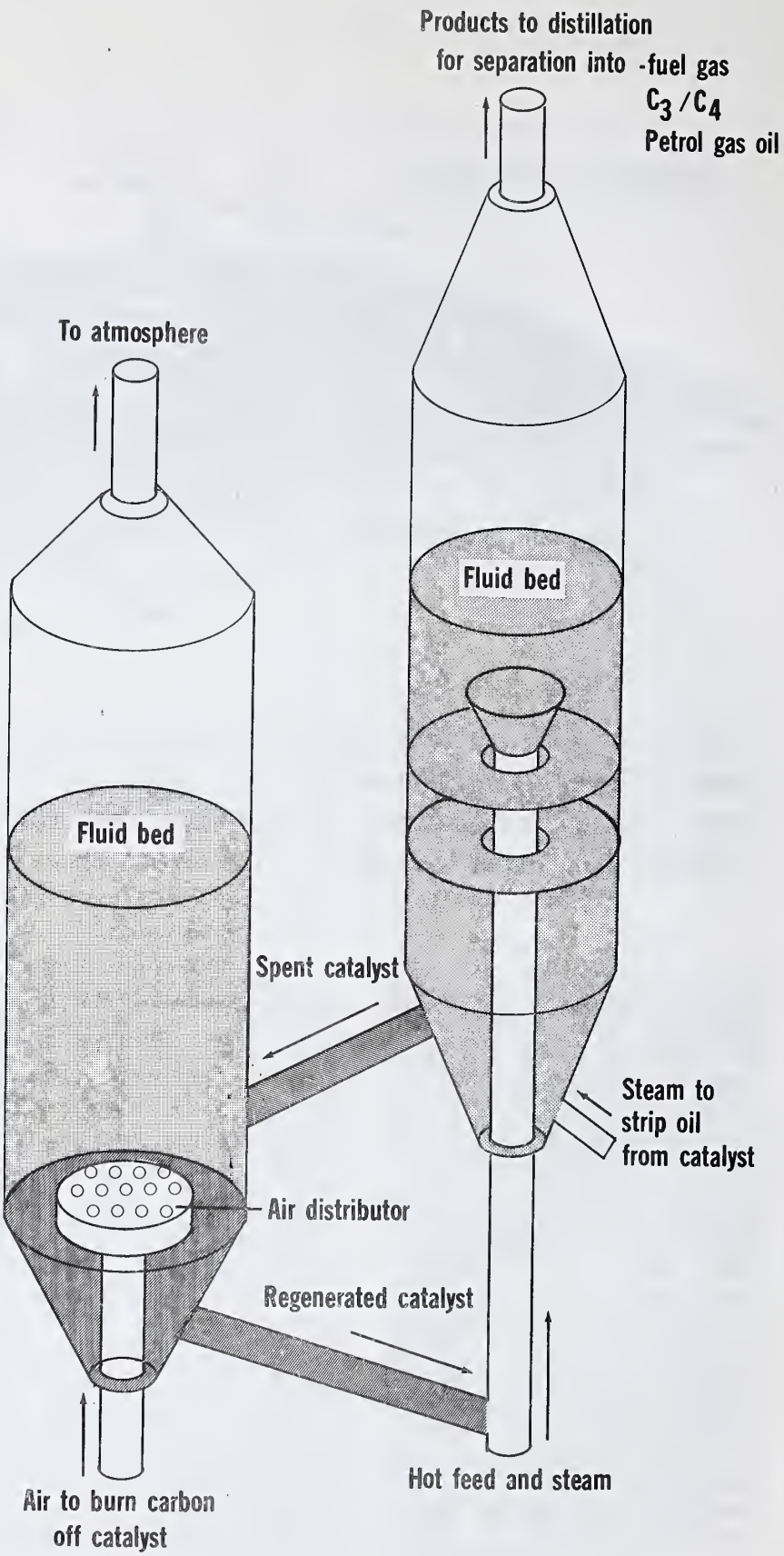
Final products for the market are, in most cases, blends of different hydrocarbons in closely controlled proportions, put together in much the same way as a pharmaceutical chemist mixes various ingredients to fill a doctor's prescription for a custom-made medicine. For example, gasoline needs slightly different ingredients in summer and winter (so that vapor lock is avoided in very hot weather and cars will start easily in winter).

The final stage for each product, after blending, is storage in suitable tanks at the refinery, until distributed for sale to customers through oil companies' marketing networks.

A modern refinery can cost $1500 million or more, and needs to be of a reasonable size to allow the economies of scale to take effect.

World refining capacity in 1983 was 77 million barrels per calendar day, of which the USA's share was almost 17 million barrels.

FL




*Reprinted from PETROLEUM GAZETTE, September 1983, Australian Institute of Petroleum.*

# Expanding the Line

**by Captain Robert W. Wegmann, USA**


Are you looking for a nice "Sleepy Hollow" kind of place to get your command time out of the way? If you are, then don't look to the Northern Operations District (NOD) of the Army Petroleum Distribution System—Korea. The old days are over when NOD was a "Sleepy Hollow" and the only problem was how many trucks there were to fill.

The Northern Operations District has undergone major changes because of the project to extend the trans-Korea pipeline, part of quid pro quo between the Eighth United States Army and the Republic of Korea (ROK) Ministry of National Defense. The project called for the Eighth Army to turn over supply point 51A to the defense ministry. The defense ministry, in turn, would fund and supervise construction of 32 miles of high-pressure pipeline and two new pump stations and upgrade a third, existing terminal. The supply point 51A was the existing head terminal located in Seoul.

The major part of the construction was begun in 1980, with pipe being laid on a route between Seoul and Uijongbu into both existing and new storage facilities at supply point 39 in Uijongbu. In June 1980, construction was begun on new terminal facilities at Kangnam and Toegyewon. These facilities were completed in June 1981.

The facilities include administrative offices, a pump station control house, and a pump house. Toegyewon also has a dining facility and troop billets. The big difference between these new stations and the existing ones is that the new stations have electric pumps that are used to boost the fuel north instead of the turbine pumps currently used south of Seoul. These electric pumps are backed up by several 6-inch, 2-stage pumps at each site.

The head terminal facilities at Uijongbu were also substantially upgraded in this project. A new boosting and transfer station was put in to couple with a new underground pipeline system that replaced the old above-ground pipe bolted together. Before this project was completed, supply point 39 received all its fuel by railcar.

Northern Operations District storage capability has been substantially increased. The 40,000-barrel storage lost at supply point 51A was relocated to a leased tank at the Korean Oil Company, which is adjacent to Kangnam Terminal. Toegyewon had two 10,000-barrel cut-and-cover (buried) tanks installed in which to store two different types of fuel. Uijongbu storage was also increased by two 20,000-barrel cut-and-cover tanks.

Completion of the overall project was delayed by numerous events, one of which was a mudslide that covered Toegyewon with over a foot of mud in July 1981. But the combined efforts of the Ministry of National Defense, the ROK Army, Korean contractors, and the soldiers and Korean national employees of the Army Petroleum Distribution System resulted in a substantial upgrade of this vital logistics supply line. The system's capability to provide full support to the combined field army, the 2d Infantry Division, and numerous other field activities has been increased immensely. Since the project's completion in September 1981, the extension has been an integral part of the full "lifeline" of Korea.

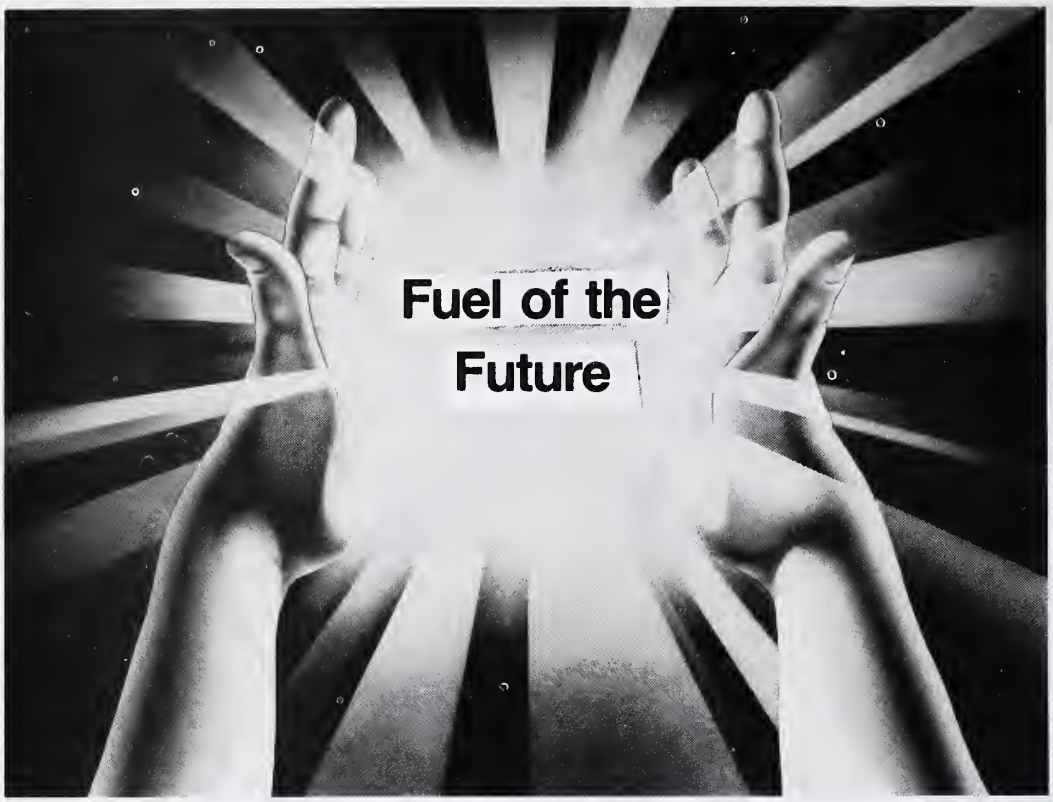
**FL**

**ARMY LOGISTICIAN**

---

*CAPTAIN ROBERT WEGMANN, USA, is deputy chief of the logistics branch, Enlisted Personnel Management Directorate, Military Personnel Center, Alexandria, Virginia. He is a graduate of The Citadel and holds a master's degree in business management from Central Michigan University, Mount Pleasant, Michigan.*

---



# Fuel of the Future

by Gerald N. Durtschi

The Department of Energy (DOE) has contracted with Geokinetics, Inc. to develop a fuel of the future from oil shale. There are approximately 1.5 trillion barrels of known oil shale reserves which could be refined to JP-4, gasoline, diesel, or any other type of fuel. The Defense Contract Administration Services Residency (DCAS) Salt Lake City, in coordination with The Defense Fuel Supply Center (DFSC), has been asked to monitor the construction of tanks, the assembly of reactors, and the installation of a hydrogen generator at the Caribou refinery in Woods Cross, Utah. DCAS Salt Lake will also assume quality assurance (QA) responsibilities for crude shipment storage and jetfuel acceptance. Gerald Durtschi, DCAS QAR, has been assigned quality assurance responsibilities for the project. Jim Hunter is his alternate.

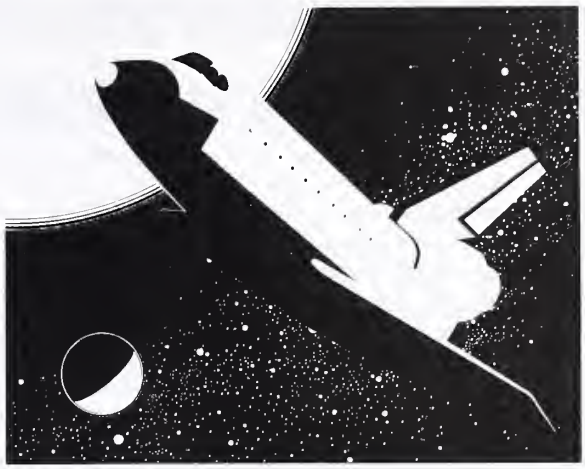
This project started several years ago when Geokinetics, Inc. invented and developed a process for removing crude from oil shale. They leased oil shale land about 70 miles south of Vernal, Utah, where they built a small camp called "Kamp Kerogin." The oil shale in this region contains approximately 25 gallons of shale oil per ton of rock, a highly favorable ratio for extraction purposes.

The oil shale recovery process involved blocking out a section of oil-bearing rock and shattering it with explosives in such a way as to have the bottom of the block slope to one end. The oil shale on the highest point is ignited and a collection well is drilled at the lowest point of the shattered rock. Air is then pumped down to sustain the burning process; as the residual carbon of the oil shale role is burned, it heats and liquefies crude oil trapped in the rock. This hot crude then runs down the slope to the recovery well where it is pumped to the surface and stored in large tanks.

Mitchell A. Lekas, president of Geokinetics, Inc., contracted with the Department of Defense (DOD) to produce 35,000 barrels of shale oil crude. DCAS Salt Lake became involved at this point. Hunter, a QA specialist, was assigned the task of monitoring the shipment of Geokinetics crude to the government storage facility at Anvil Points, Colorado. Hunter traveled by 4-wheel drive truck to Kamp Kerogin to witness quality testing and to monitor tank and truck loading. This recovery process proved successful; the government became the proud owner of 35,000 barrels of shale crude oil that will be refined into the type of fuel that our country can rely upon.

The next step was to refine the crude into JP-4 turbine fuel, gas, and diesel fuel. This required the use of an oil refinery modified to process crude shale oil. Paradoxically, this whole program was made possible by the crude oil glut and the great reduction in the demand for gasoline. The Caribou Oil Refinery in Woods Cross, Utah, was forced to cease operations because the price of crude was too high and gasoline demand too low. They were caught in an economic vise. This small 5000-barrel a day refinery became available to the government for crude shale oil operations.

The DOD was now in a position to contract with Geokinetics, which would subcontract with Caribou to refine the government shale crude oil. The $7 million contract called for modification of the refinery, transportation of reactors, pumps, vessels, and pipes from Fort Lewis, Washington, and the assembling of a refinery that would make 80,000 barrels of our



*"Start-up operations made the news on several occasions by shooting great plumes of flame and smoke into the air when a pipe or connector failed and the crude oil ignited."*

future fuel.

Durtschi monitored the changes taking place at the refinery. Footings were dug and foundations poured. The reactors and hydrogen generator arrived and were installed. Durtschi monitored the arrival of the crude from Geokinetics and coordinated with Russ Haberlah of Defense Fuel Region, Central, for its storage and transfer. Eddie French, director of the DFSC Synthetic Fuels Office and Haberlah made numerous trips to Utah so that they could observe progress and offer advice and assistance. John Wright, DCAS, St. Louis, also came to Salt Lake City to provide assistance and to give training in rail car and tank truck shipping and inspection to the local QARs.

With the coordination of DLA, DFSC, the Air Force, DCAS, Geokinetics, Caribou, and with a lot of luck, the valve was turned and the first crude entered the unit. The process of converting a very thick, black, smelly, semi-solid substance into our future fuel had begun.

There were many problems to overcome, some caused by the fact that the refinery had been closed for a year. Corrosion and lack of maintenance had taken its toll. Start-up operations made the news on several occasions by shooting great plumes of flame and smoke into the air when a pipe or connector failed and the crude oil ignited. It became commonplace for the TV crews from the local stations to arrive at the refinery before the firemen. However, with even greater determination and cooperation, each problem was overcome, and success grew closer. The Air Force sent in some of their best troops, Chuck Delany, Herb Lander, and John Yount, to assist Vince Memmott and Paul Johnson in fine-tuning the refinery. Contamination sources were found, problems were defined and solved. Finally came the time for Durtschi, Paul Johnson of Caribou, and John Yount of the Air Force to sample the tank. Their hopes were realized when they were able to declare the fuel a good product. Our government now had its first batch of jet fuel made from oil shale that met all specifications.

The fuel will be shipped to Pratt & Whitney Aircraft, West Palm Beach, Florida, and Air Force Wright Patterson Aeronautical Lab in Ohio, for a very thorough and lengthy test program. When the test program is successfully completed, the F-16s at Hill Air Force Base, Utah, and the F-111s at Mountain Home Air Force Base will be fueled totally with JP-4 made from crude shale oil. **FL**

*This article is reprinted from* NEWSCASR, *Defense Contract Administration Services Region, St. Louis.*

# Despite Unpredictable Market, DFSC Steers Steady Course for Small Business

**by Linda Stacy-Nichols**

Shirley Downes knows the meaning of the phrase "caught between a rock and a hard place." As the Defense Fuel Supply Center's (DFSC) small and disadvantaged business utilization (SADBU) specialist, Downes monitors the lean and fat of world energy markets—and witnesses the havoc both can wreak on SADBU clients.

During shortages such as those fostered by the Arab oil embargo of more than a decade ago, small and disadvantaged businesses find it difficult to obtain products to fill supplier commitments. But when the fuels market is soft, and spirited competition drives prices lower, the same small and disadvantaged businesses are in another quandary: how to compete when more established concerns can offer better prices?

In spite of the unpredictability of the industry, SADBU clients can have confidence in DFSC's commitment to their needs. Last fiscal year, contract awards to small businesses exceeded $3 billion. Awards to small disadvantaged businesses totalled nearly $400 million, with the preponderance made for products used by military posts, camps, and stations. Included under this category are gasoline, diesel fuel, heating and residual products.

These monetary goals are programmed yearly based on historical data, SADBU successes, and DFSC mission requirements, all in accordance with regulations and the projected budget. (The effort to boost small and disadvantaged businesses into self-sustaining entities is government-wide, with the current Administration requesting a 10 percent increase in our commitments to small disadvantaged businesses.) External factors, especially worldwide political and economic conditions, also have an impact on the program's goals.

DFSC's ability to maintain these monumental goals is testimony to cooperation amongst the SADBU staff, other DFSC employees and various government agencies. The SADBU office is staffed with three full-time employees and assisted by a procurement center representative from the Small Business Administration and by a small business technical advisor. The responsibilities of Ms. Downes and company are spectral, ranging from reviewing proposed procurements in excess of $2,500 for possible small business awards to acting as ombudsman when problems arise.

Orientation of incoming DFSC employees is another integral role SADBU plays. By attuning contracting personnel and others to the unique needs and problems of small and disadvantaged business clients, both the government and businesses benefit. Two case studies from the Directorate of Contracting and Production (DFSC-P) illustrate the value of harmonious working relationships.

Prior to the transfer of some mission functions to the Defense General Supply Center in Richmond, Virginia, procurements by the DFSC Lubricants and Specialty Products Division ranged from 1-ounce tubes of grease to a half million or more gallons of lubricating oil (some of which is used on Air Force One). These highly specialized products are crucial to the operation of ships, tanks, planes, guns and other forms of military hardware. Because many large businesses are not generally set up to handle the small quantities and small packaging characteristic of some of the products required, the division relied heavily on small businesses to ensure stock supplies were maintained.

Further complicating the acquisition process were conditions offered by bidders, including tie-ins, aggregates, and minimum/maximum quantities.

These stipulations, which often varied from one solicitation to the next, ensured an overall lowest cost to the government. For the inexperienced small business person, however, these complexities were mind boggling.

Such was the case last year when a small company ran into difficulty in commercial trade and veered away from its usual function as a supplier to other companies in order to bid on DFSC procurement requests. The business had shunned government contracts in the past because of red tape. If not for the efforts of procurement agent Marge Bartell, it might well have continued to avoid such contracts—to the detriment of DFSC and the company itself.

Because of a lack of savvy in the whys and wherefores of government acquisitions, the company's first two bids were rejected as nonresponsive because they unwittingly took exceptions to the solicitations. Noting an opportunity to increase competition and aid small business, Mrs. Bartell contacted the company and explained the precise details of how bids were evaluated and awarded. As a result of her efforts, the firm later received contracts worth $2 million. Mrs. Bartell's work was cited as a "tremendous factor" in keeping employees on the payroll and the company solvent.

Such assistance to SADBU clients is essential throughout the procurement process, as the post-award efforts of Mrs. Darlene Robinson proved. A contract administrator in the Production Division of DFSC-P, Mrs. Robinson was called upon to assist a small disadvantaged business which had received several contracts to supply products to posts, camps, and stations. Such agreements often involve multiline items and are further complicated by price escalation and deescalation clauses and more than one paying office. During the span of these contracts, prices may fluctuate daily and even the most seasoned companies find it a challenge to keep records current. One contractor's records became confused because he was delivering under two contracts with different escalation provisions.

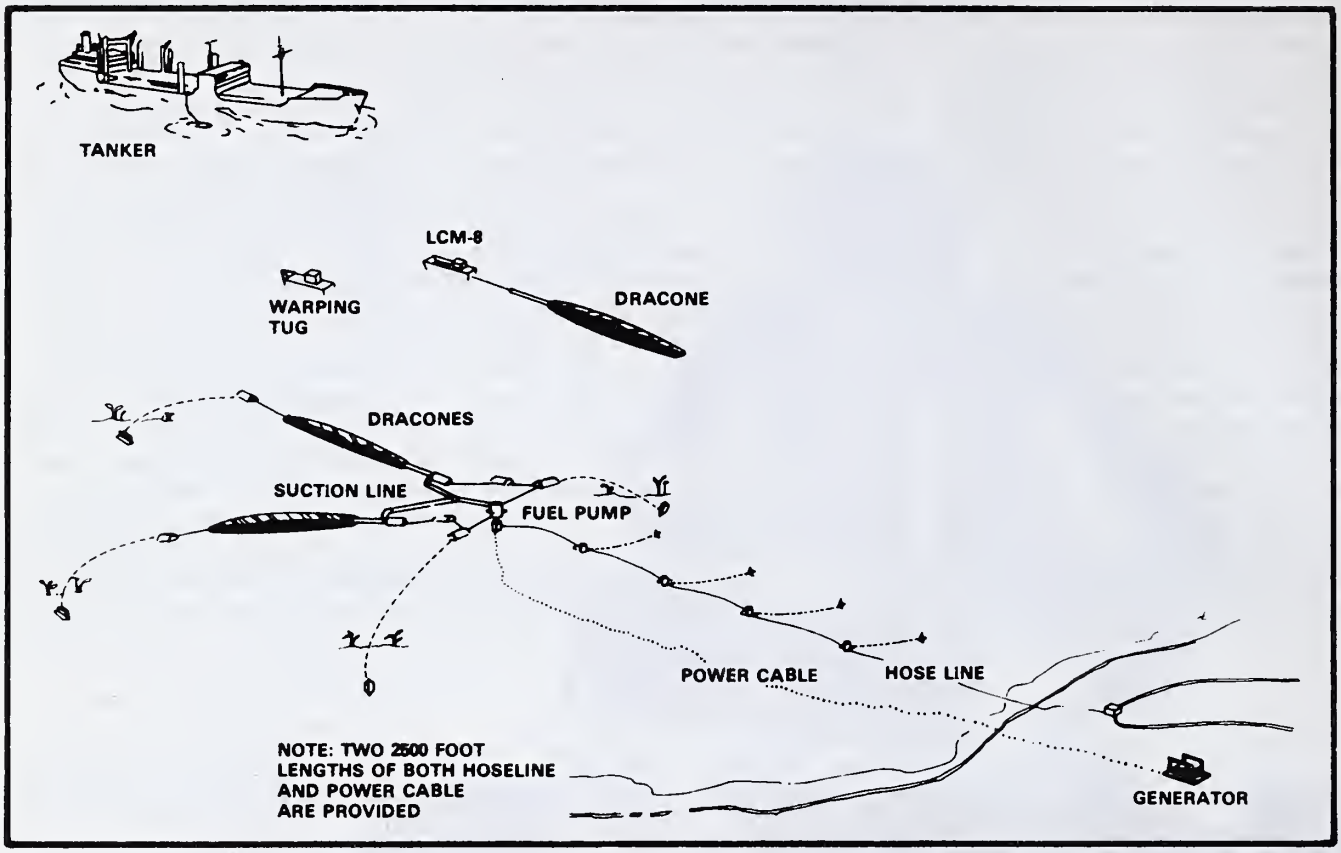
After receiving a letter from the disadvantaged company requesting aid in sorting out the business' records, Mrs. Robinson patiently and diligently reviewed the invoices. The discrepancies were resolved after a year of careful work and close coordination with DFSC financial offices. Throughout her efforts, Mrs. Robinson made detailed explanations of her findings to the contractor, while maintaining her assigned workload of almost twenty other small business contracts.

Mrs. Bartell and Mrs. Robinson are DFSC's nominees for the 1983 DLA excellence in assisting small and disadvantaged business awards. **FL**

*Margaret Bartell*

*Darlene Robinson*

# NCEL Designs Offshore Bulk Fuel System




**THE AMPHIBIOUS ASSAULT FUEL SUPPLY FACILITY (AAFSF) can be installed within three days to provide 440,000 gallons of fuel a day to military forces ashore. This facility is a component of an Offshore Bulk Fuel System being developed by the Naval Civil Engineering Laboratory, Port Hueneme, Calif.**

Approximately 1,000,000 gallons of fuel a day—offloaded from a tanker moored 2 miles at sea and delivered by pipeline to shore.

This is the staggering supply the Marine Corps ground and air forces will demand to conduct a successful amphibious landing upon an undeveloped beach.

Since no existing fuel systems offer such logistical capabilities, the Navy is adapting commercial components into its development of the new Offshore Bulk Fuel System (OBFS) designed to satisfy specific Navy/Marine Corps requirements through the 1990s.

As lead laboratory, the Naval Civil Engineering Laboratory (NCEL), Port Hueneme, California, has designed an OBFS to be installed and fully operational in 17 days to provide the maximum fuel supply needed. But results from tests at sea reveal that complete installation and full-flow rate can be achieved after 14 days.

The Naval Facilities Engineering Command is the developing agency of the project and the Strategic Sealift Branch, Chief of Naval Operations, is the sponsor.

NCEL project leader Daniel True said that the OBFS consists of two facilities: the Amphibious Assault Fuel Supply Facility (AAFSF) and the Amphibious Tanker Terminal Facility (ATTF). Once amphibious forces have landed with temporary stores of petroleum, oil, lubricants (POL), and emergency supplies, the installation of both facilities gets underway concurrently.

AAFSF provides the short-term capability. Installed within 3 days, it provides 440,000 gallons of fuel a day. It is operational in sea state 3 with waves up to 5 feet. ATTF provides reliable off-loading of tankers up to 70,000 dead weight tons in sea state 5 with waves up to 12 feet. Despite these severe offshore conditions, the system is capable of providing 2,000,000 gallons of POL daily, satisfying the long-term, all-weather need of a million gallons a day.

Part of AAFSF, a 6-inch buoyant hose, can be installed in 4 hours from the beach to LSTs moored 5,000 feet offshore. This delivery method provides 300,000 gallons a day initially. AAFSF is completed with the addition of four towable rubber bladders, a mooring, and a transfer pump

to shuttle fuel from offshore tankers. Each bladder is 220 feet long, 11 feet in diameter, and holds 110,000 gallons. It is towed by a powered work barge from the tanker to the AAFSF bladder mooring located 2,500 feet offshore. Two bladders can be accommodated in this mooring at once. An electric pump, with a switching valve, unloads one bladder while the other, empty one is replaced with a full bladder. POL is carried by the 6-inch buoyant hose to shore.

The long-term ATTF, the heart of the OBFS, consists of a single point mooring (SPM) fuel buoy to which the tanker moors, high-capacity catenary anchor legs incorporating high-strength chain and four large drag embedment anchors, underbuoy hoses, a pipeline end manifold (PLEM), interconnecting hoses, and two 10,000-foot, 8-inch bottom-laid pipelines. This facility will provide the POL the Marine Amphibious Force will need from the 18th day after landing to a nominal 6 months.

Especially designed lightweight and portable SPM fuel buoy is an integral component of a functional and acceptable ATTF. The laboratory has streamlined existing commercial configurations, adapting industry concepts to match logistical support capabilities of Navy Amphibious Construction Battalions responsible for the installation and operation of the ATTF.

True said the SPM affords safe mooring for tankers in mud and sand seafloors. It can be installed in 65-200 feet of water at virtually any landing beach, in polar, tropical and temperate environments.

The SPM fuel buoy includes a buoy structure weighing less than 130,000 pounds (approximately half the weight of a commercial one) with a diameter of 28 feet and a hull depth of 10 feet. It contains a two-product distribution unit, a cantilevered two-arm rotation unit, and four hawsepipes. It incorporates the American Bureau of Shipping safety factor of two on anchor capacity, and three on chain and structure strength, to give a mooring capacity of 225,000 pounds in any direction. The hawser is a single mooring line 225 feet long and 18 inches in circumference, and is fitted with small lines, resulting in a self-pickup capacity.

Briefly, the nominal 17-day installation of ATTF begins with a site survey, beach preparation, and anchor/chain preparation occurring simultaneously. After 4 days, anchors and chain legs are ready for installation. The pipeline is ready on the beach for preassembly into 100-foot lengths and towout. During the next 5 days, the anchors are installed and the two 10,000-foot pipelines are towed into position. On the 10th day, the PLEM is connected to the pipeline hoses and anchored on the seafloor. From day 11 through 15, the mooring legs are connected to the SPM, and the adjusting of the buoy position and chain pretensioning is completed. Connection of the underbuoy and offbuoy floating hoses and hawser are completed on the 17th day.

*"The nominal 17-day ATTF installation requires 10-hour work days, four powered and seven non-powered work barges, a maximum 95 workers on any given day, and an inventory of equipment that includes cranes, bulldozers, rough terrain forklifts, and air compressors."*

The nominal 17-day ATTF installation requires 10-hour work days, four powered and seven non-powered work barges, a maximum 95 workers on any given day, and an inventory of equipment that includes cranes, bulldozers, rough terrain forklifts, and air compressors.

But faster installation times are being sought. True said a 9-day installation could be achieved when the following pending improvements are incorporated into the operations:

- With more personnel, around-the-clock work could prove a vital time saver.
- Special chain packaging and placement of a portable windlass on the chain-deployment vessel would eliminate the need to transport the chain to the beach.
- The PLEM, underbuoy hoses, and pipeline end hoses might be replaced with 300-foot lengths of flexible pipe.
- A second chain tensioner could be placed on the SPM, allowing chain connection and tensioning on two legs simultaneously.
- The use of three support vessels would permit the towout of two pipes at the same time.

A prototype ATTF has been developed, tested and improved during the last 3 years. Test results of at-sea installations of the new SPM have revealed no major difficulties during the offloading, hose assembly, pipeline and PLEM installation, or positioning of the four anchor legs. During final fleet operational evaluation tests last summer, data showed that the nominal 17-day installation with the existing design can be completed in 14 days under favorable environmental conditions.

Although designed to provide the Navy with a capability to respond quickly with logistical support during a major amphibious operation, OBFS technology can be adapted by the offshore oil and transport industries. With the use of the expedient ATTF installation procedures and hardware designs, commercial moorings can be temporarily installed where weather windows for installation are severely limited, where specialized ocean construction platforms are not readily available, or where construction diver assistance is limited.

Diver involvement in the ATTF installation is limited to observation, measurements and inspection at maximum depths of 150 feet. All construction work, such as securing underbuoy hoses to the buoy after PLEM installation, is done at maximum depths of 30 feet.

FL

# Transportation Officers Meet for Workshop at DFSC


*Shown with DFSC Commander Rear Admiral William J. Ryan, SC, USN (center), are the Defense Fuel Region (DFR) traffic managers who attended the transportation officers' workshop held at Cameron Station. Pictured from left to right are: Michael J. Corbett, DFR-Northeast; Dennis A. Edwards, DRF Central; Ceable Hughes, DFR-Southeast; William G. Rosenberg, DFR-West; and Eugene B. Pavey, DFR-Southwest.*

**by Chester Doberson**

As a result of deregulation in the transportation industry and the emergence of broader-scale automation, traffic managers are confronted with an array of challenges and opportunities in a highly competitive environment. Imagination and the development of creative approaches are required to fulfill military fuel requirements in a safe, efficient and economical manner.

This philosophy guided the last Defense Fuel Supply Center/Defense Fuel Region (DFSC/DFR) Transportation Officers' Workshop, which was hosted by the Transportation Division of the Supply Operations Directorate in October 1983. Five years had elapsed since the last such meeting was held.

The key points discussed in the conference included the impact of deregulation on the transportation industry, current economic conditions, restricted shipping delivery, guaranteed traffic negotiations, control of demurrage and product losses, diversification in fuel procurement and distribution patterns, and progress made in the automation of transportation rates.

The workshop combined the practical experience of DFSC/DFR transportation personnel and fostered a free exchange of ideas to improve current transportation programs and produce a better understanding of fuel distribution problems to reduce costs and product losses which occur during the transportation phase.

Participants deemed the workshop highly successful and productive. **FL**

*CHESTER C. DOBERSON is a supervisory traffic management specialist in DFSC's Transportation Division, Directorate of Supply Operations.*

# FUEL LINE

## You are entirely welcome

. . . to submit articles for the DFSC FUEL LINE. As the only DFSC publication of its type, FUEL LINE strives to present features of a nature which will serve the interests and needs of all readers. This isn't possible without the submissions of DFSC personnel and fuel clientele.

All readers are invited to send articles or story ideas. We have an ongoing, special need to keep up with the activities of the field elements, and would also appreciate submissions from our military and civilian customers.

Please address all submissions and correspondence as outlined on the inside front cover.

## LEON STANN

*Leon Stann, 66, a retired Army colonel who specialized in petroleum reserves and was a heavily decorated pilot in World War II, died of cancer on 29 March at Milford Memorial Hospital in Milford, Delaware.*

*Colonel Stann, who lived in Washington from 1952 until moving to Milford in 1972, was born in Perth Amboy, New Jersey. He graduated from the U.S. Military Academy at West Point, New York, and earned a master's degree in petroleum engineering at the University of Pittsburgh.*

*During World War II, he was a bomber pilot in the Army Air Forces. His post-war assignments included various tours of duty at the Pentagon, including an assignment in the Office of Scientific Development, the Military Petroleum Supply Agency and the Defense Fuel Supply Center, where he was deputy commander when he retired in 1970. Colonel Stann served as DFSC commander from 19 October to 17 November 1969.*

## Marine Dinosaurs

Only five years ago, supertankers were the monarchs of the oceans, dwarfing other types of vessels—and proving too large to dock at most ports. Now they're starting to be turned into washing machines, tinned cans and concrete reinforcing while smaller tankers handle shipments quickly and economically.

Take, for instance, some happenings in the supertanker fleet in July and August of last year.

A French Company, Ste. National Elf Aquitaine, advertised the 555,051 dwt (the tonnage a ship can carry) *Pierre Guillaumat* for sale. It was the biggest vessel ever to be placed on the resale market, according to brokers.

Six years ago, the *Pierre Guillaumat* cost $120 million to build. Last fall, it was purchased for just $8 million—for scrap. A month later, the tanker was almost gutted, and shortly after that, a South Korean breaker's yard finished its destruction.

Up until the end of last summer, 45 ultra-large tankers had been sold for scrap throughout 1983 (12 of them in July and August alone).

---

(Excerpted from the *Petroleum Gazette*, September 1983, the Australian Institute of Petroleum, Ltd.)

---

# More Overseas POL Storage Planned

Increased oversea storage of bulk petroleum, oils and lubricants (POL) will result from a recent change in the Army's plans for pre-positioning supplies for possible use in Southwest Asia. Under the change, the Army will expand its use of storage facilities in or near Southwest Asia. Conversely, less POL earmarked for Southwest Asian contingencies will be stocked in the continental United States (CONUS). This change should reduce CONUS storage costs, eliminate the need to rotate POL supplies within CONUS to maintain their quality, and improve support to Army units that may be deployed in Southwest Asia. *(Army Logistician).*

# Rhein-Main Wins 1983 API Trophy Competition

**by Lieutenant Colonel**

**Terry J. Arnholt, USAF**

The results of the 1983 American Petroleum Institute (API) Trophy Competition are in and the winner is Rhein-Main Air Base, Germany. Runners-up include MacDill Air Force Base, Florida, and Dyess Air Force Base, Texas. Although Rhein-Main personnel achieved close to the maximum score in all areas, the competition was extremely keen, the difference between the top three contenders very small indeed.

THE PARTICULARS OF EXCELLENCE

One of the API Trophy evaluators characterized Rhein-Main as a base which received a well-deserved outstanding rating on its June 1983 Organizational Readiness Inspection—and has been improving ever since.

In addition to exemplary comments on the sound-on-slide training aids and the fuel recovery programs, four other areas were single out for recognition: the self-help projects, cooperation with liquid fuels maintenance, practically error-free accounting and the condition of the cryogenics section.

The younger airmen made a distinct impression on the evaluators, who cited their knowledge, appearance and attitude as exceptional.

WHAT MAKES A BASE WINNER?

This question was posed to several "old time POL" (petroleum, oils and lubricants) troops and the counsensual response was "pride."

A more exact formula for success often offered is "a mixture of the right fuels officer and superintendent, good NCOs and airmen who are motivated to be part of the 'best' Fuels Management Branch in the Air Force."


Precisely how to cultivate this winning combination is beyond the capacities of most of us. We can all recognize, however, the effects when this elusive chemistry takes over: the major command readily allocates resources; the wing commander, resource manager and chief of supply are all personally involved and interested; safety and training records are exemplary; aircraft refueling delays are non-existent; spills are few; first echelon maintenance is outstanding; and the accounting is almost flawless.

BIGGEST BENEFIT TO THE AIR FORCE? PEOPLE

Probably the most significant benefit the contest creates for the Air Force is that nucleus of people who continually strive for the top honor and who carry this enthusiasm with them when they move on to other Fuel Management Branches.

A superintendent once told a young fuels officer: "We placed second in the API Competition at my last base. If we can get the support of the chief of supply, resource manager and wing commander, I am sure we can win."

The superintendent was not the victor that year, but this winning attitude is bound to have an effect throughout the POL community.

PAST API TROPHY AWARD-WINNERS

1966—Travis AFB, California
1967—Naha AB, Okinawa
1968—Andersen AFB, Guam
1969—Mountain Home AFB, Idaho
1970—Tyndall AFB, Florida
1971—Tyndall AFB, Florida
1972—Mountain Home AFB, Idaho
1973—Carswell AFB, Texas
1974—Hickam AFB, Hawaii
1975—No trophy awarded due to lack of funds
1976—Hickam AFB, Hawaii
1977—Hickam AFB, Hawaii
1978—Hickam AFB, Hawaii
1979—McConnell AFB, Kansas
1980—Minot AFB, North Dakota
1981—Hickam AFB, Hawaii
1982—Torrejon AB, Spain
1983—Rhein-Main AB, Germany

**FL**

---

*LIEUTENANT COLONEL TERRY J. ARNHOLT, USAF, previously the chief of DFSC's Stock Control Division, is now the commander of Air Force Detachment 29.*

---

# Fort Belvoir Develops Antifreeze Additive

A new method of preserving antifreeze has been developed at the Belvoir Research and Development Center that could, according to Army officials, save the service millions of dollars annually.

The liquid chemical extender, scheduled to enter the supply system next spring, should prolong the life of used antifreeze at least four years, says projects engineer James Conley.

"Presently the Army's composition-based antifreeze should stay effective for at least 5 years," Conley says. "If used properly and in conjunction with the technical bulletin governing standard use of antifreeze this additive could extend antifreeze life to 10 years."

By utilizing the Army's Reserve Alkalinity Test Kit, soldiers in the field can quickly indentify ineffective antifreeze and then add the extender.

The additive project was developed by Conley and technician Robert Jamison of the Center's Fuels and Lubricants Division.

According to Defense Department procurement figures, the Army is presently spending over $12 million annually on antifreeze replacement. Officials say with proper use of the test kit and reinhibiting extender this figure could be cut to $2 million.

Even further DOD savings will be realized if other services adopt the product, says Conley.

The R&D Center at Fort Belvoir is part of the Army's Troop Support Command. Its 1,200 military and civilian personnel are responsible for research, development and initial acquisition of military equipment in more than 20 different areas related to battlefield mobility/countermobility, survivability, energy, and logistics. **FL**

# Beacon Synfuel Concept Moves from Laboratory to Larger-scale Tests

An advanced concept that could open up new possibilities for converting coal and other carbon-containing materials into synthetic fuels has shown sufficient promise in laboratory tests to warrant scaling up the technology, Department of Energy research officials said.

The concept, termed the BEACON process (for Btu Extraction And Conversion), employs a chemical route that differs considerably from the chemistry of other synthetic fuel conversion methods. It is being studied by scientists at the Redondo Beach, California laboratory of TRW, Inc., under a $1.6 million, 1-year contract awarded by the Energy Department's Morgantown Energy Technology Center in September.

A key to the BEACON concept is its use of special catalysts. Catalysts are substances that help start or speed up the chemical reactions without actually taking part in the reaction. The BEACON process is based on the patented discovery that under certain conditions, carbon atoms will deposit on special iron-based catalysts, much like gold or silver can be plated into other metals.

In an early version of the process, first orginated by TRW in the mid-1970s and developed in part using federal funds, the carbon atoms would be deposited from low-grade coal gases. Steam would then be passed over the catalyst. The carbon atoms would be released to combine with the hydrogen in the steam, and the resulting chemical reaction would form methane, or "synthetic natural gas."

In a newer approach being pursued under the current federal contract, scientists are, in effect, studying the reverse of the original process.

Carbon atoms are extracted from natural gas or methane, a by-product of some coal gasification processes, and reacted with oxygen over the catalyst to produce a mixture of carbon monoxide and hydrogen—two substances that can then be used to make a wide variety of liquid and gaseous fuels or chemicals such as methanol.

Federal officials believe that both versions of the BEACON concept may eventually be used by industry. Either may have future application in synthetic fuel plants to produce a broad range of synthetic gas constituents from an array of materials. The newer version of the BEACON process, in particular, might be especially useful in boosting the yield of hydrogen and carbon monoxide from certain coal gasifiers that inherently produce large quantities of methane.

This flexibility, coupled with the refocusing of the federal synthetic fuels program away from methane producing systems, was the impetus behind the department's decision to fund continued work to determine if the "reverse" BEACON technique had potential for producing gases rich in carbon monoxide and hydrogen.

Now, scientists have increased their confidence that the specially developed BEACON catalysts are durable enough to withstand the necessary reaction conditions. Since September, catalysts have been tested for up to 230 cumulative hours at temperatures of up to 1000 degrees C.

As their next step, the scientists will scale up the process' quartz-lined, cylindrical reaction vessel from a 1-inch diameter laboratory unit to a 3½ inch diameter "benchscale" unit. This, federal officials believe, is expected to verify that the process works at scales large enough to interest industry in pursuing further development on its own.

# New Class of Oil Boom Undergoing Evaluation

Placing oil booms around ships in port, even around large aircraft carriers and submarines, has become routine for the Navy to keep harbor waters free of oily wastes. Much of a port's industrial activity centers around transferring fuels to the docked ships, and the booms automatically contain any spills.

A new class of booms, which is lightweight, easy to handle, and rides well under tow, is undergoing evaluation by the Navy Civil Engineering Laboratory (NCEL). The booms are hard-skinned polyethylene foam semi-cylinders with a skirt of polyurethane-coated Kevlar. The Kevlar material is a polymer, extremely strong and extremely durable, with excellent weathering properties.

Operational tests on the new booms were conducted at Long Beach and Port Hueneme harbors. Two types of booms, differing mainly in size and weight, were evaluated. They were subjected to extreme environmental conditions which included running over the booms with a boat, towing them at high speed in strong currents, and dragging them over concrete quay walls.

The tests were performed with boom sections ranging from 50 to 1000 feet, with various types of small naval craft. During the maximum operational stress test, a 1000-foot boom section was taken to open sea and towed in 5-foot waves at 10 knots per hour, which placed a 3650-pound stress on the boom section. The Kevlar did rip during the test; but, when examining the condition afterwards, researchers found that the rip was caused by a failure in a bolt hole on the flotation device and could not be attributed to any weakness in the skirt material.

The laboratory's at-sea tests also included a 20-minute, simulated oil spill using shredded pieces of foam. Two boats, with a 200-foot distance between them, brought a 450-foot boom section into a U-shaped tow. None of the foam particles washed under or over the boom. At the apex of the tow the boom listed at an angle of 10 to 30 degrees but still contained all the debris. **FL**

# Southern California Health Club is Site of Newest Fuel Cell Power System

*"Each of the on-site fuel cells generates 40 kilowatts of electricity and up to 150,000 Btu's per hour of useable heat, enough to supply all or part of the energy needs of buildings such as hospitals, apartment houses, restaurants and similar facilities."*

Racquetball players working out at a southern California health club may not be able to tell the difference, but since late December, their courts have been lit and their showers heated by one of the nation's most advanced energy systems—a fuel cell.

A fuel cell is a noiseless, virtually non-polluting power system that produces energy by an electrochemical reaction rather than by combustion.

The recent delivery of two fuel cell power units to Racquetball World Aerobic & Health Center in Fountain Valley, California, outside of Los Angeles, marks the beginning of an extensive government-industry program to test more than 40 small, so-called "on-site" fuel cell systems in a variety of applications.

The fuel cell test program is being co-funded by the U.S. Department of Energy, the Gas Research Institute, and more than 30 gas and gas/electric utilities. The fuel cell systems were

designed and manufactured in South Windsor, Connecticut, by United Technologies Corporation.

The fuel cells are termed "on-site" because, unlike large, centrally located power stations, these small power systems—each of the 8,000-pound units is about the size of a garden tool shed—can be installed at the location where the energy is used.

Each of the on-site fuel cells generates 40 kilowatts of electricity and up to 150,000 Btu's per hour of useable heat, enough to supply all or part of the energy needs of buildings such as hospitals, apartment houses, restaurants, and similar facilities.

The systems operate using natural gas as a fuel which is combined with air in an electrochemical reaction that releases heat in the form of steam or hot water and produces electricity. Because this is an electrochemical reaction rather than combustion, the fuel cell plant is extremely quiet and environmentally benign. **FL**

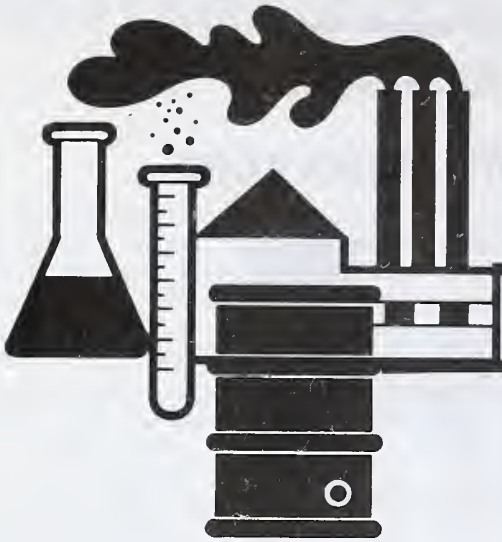
# EIA Assesses Petroleum Resources of Mexico

Mexico has an estimated 30 billion barrels of proven crude oil reserves, according to a new report released by the Energy Information Administration (EIA). The report indicates that Mexico has the future potential of producing crude oil at a significantly higher rate than the 1982 production level of about 2.6 million barrels per day.

The report makes these key points:

- As of January 1, 1982, there were at least 298 developed, developing, or abandoned oil fields in Mexico that originally contained about 193 billion barrels of oil. Of this, about 39 billion barrels are estimated to be ultimately recoverable. Cumulative production to 1 January 1982, was about 9 billion barrels, leaving an estimated 30 billion barrels of proven oil reserves remaining to be recovered.
- As of 1 January 1982, the total estimated undiscovered recoverable oil had a statistical mean value of 76 billion barrels at a corresponding probability level of 38 percent. Adding this oil to the country's known ultimate recovery results in an estimated total recoverable resource base of 115 billion barrels.
- In 1982, Mexico produced crude oil at a rate of about 2.6 million barrels per day. The study indicates that Mexico could continue to produce at the 1982 production level until the year 2081 if the statistical mean value of estimated recoverable oil is confirmed through subsequent development.
- Considering that the discovered and undiscovered resource base is 115 billion barrels of oil, it is believed that an additional producing capability of about 4.6 million barrels of oil per day might be developed for a total maximum producing capability of 7.2 million barrels of oil per day. Alternately, at the modal value of 89 billion barrels of oil, it is believed that an additional producing capability of about 3.1 million barrels of oil per day might be developed for a total maximum producing capability of 5.7 million barrels of oil per day.

Copies of *The Petroleum Resource of Mexico* are available from the U.S. Government Printing Office for $5 per copy, GPO stock Number 061–003–00355–9. Copies are also available through the *National Energy Information Center, Room IF-048, Forrestal Building, Washington, D.C. telephone 202/252-8800.* **FL**



# FUEL LINE GLEANINGS

## Container Solution

**letter to ARMY LOGISTICIAN**

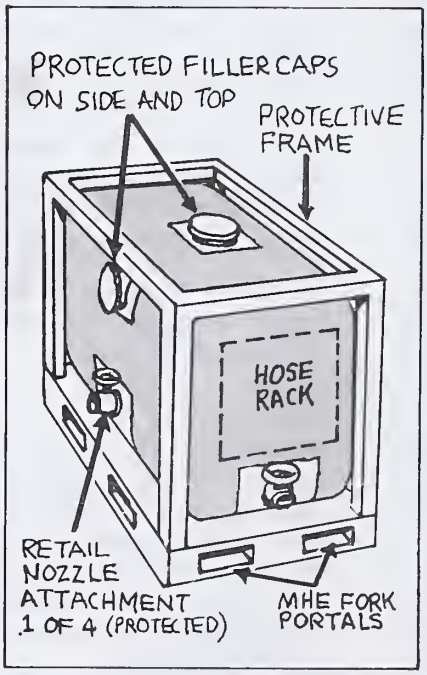
**by Captain Larry D. Harman, TC**

As transportation planner with a background in supply, I am quite concerned about wartime resupply of materiel to our battalion task forces. Of utmost importance is the movement of petroleum products forward to POL (petroleum, oils, and lubricants) supply points in the division. Here, enormous quantities of bulk POL must be supplied on a daily basis. In future conflicts, present POL transportation assets may not be in sufficient quantity to meet these requirements.

In an effort to remedy this situation, I propose that the Army develop and expeditiously field a versatile, yet simple, fuel container which could be loaded on any flatbed trailer, or in most tactical cargo vehicles and their trailers. The fuel container would hold a minimum of 600 gallons.

The tactical advantages of such a system deserve mentioning. A POL supply point, whether at division level or at an isolated foreward area resupply point (FARP), could be established rapidly. Mobility and dispersion of POL assets are enhanced. Fueling times for tactical units could be drastically reduced. Flatbed trailers organic to the division could have a POL resupply mission. In addition, several POL products could be transported on the same flatbed trailer. Under this concept a mobile fuel station could be established along convoy routes allowing the organic 5,000-gallon tankers of the division to remain full for future contingencies.

From a purely logistical standpoint, the fuel container concept is quite valid. As stated earlier, a variety of vehicles and trailers could transport fuel. Depending on mission priorities, dry cargo transport units could be tasked to provide fuel forward. Because these same units have two assigned trailers per tractor, a certain percentage of trailers could be dedicated to move fuel with the remaining trailers tasked to haul ammunition and other supplies. The fuel containers could be easily stacked for storage. Several vehicles could be refueled simultaneously from one container. The containers could be airlifted. Whether full or empty, the containers could be easily handled by materiels handling equipment (MHE). Additionally, one resupply trailer could conceivably transport fuel containers and ammunition as one load. This type of container could also be used to transport water.




As one can readily see, this type of container has its place in the Army inventory. Concept application is not intended to replace the utility of POL transport companies but rather supplement POL resupply efforts from theater to company level. Containerization is here to stay—not because it is a fad but because it is efficient and, in this case, effective. I challenge any agency to develop and field a better means of fueling forward. **FL**

# Waste Oils Fuel Navy Boilers

Twenty to thirty million gallons of waste oils are generated each year by Navy ships, by Navy and Marine Corps bases ashore, and by aircraft facilities. In the past, these waste oils were disposed of by dumping, burning for firefighter training, or contracting with commercial firms for their removal. Now, the Naval Civil Engineering Laboratory (NCEL), Post Hueneme, California, has developed a use for the waste oils—as a supplemental fuel in Navy boilers.

As the cost of fuel oil for boilers was increasing, the laboratory began a search for alternative energy resources. One of the more successful research efforts is described in a recently issued report on the *Utilization of Navy-Generated Waste Oils as Boiler Fuel—Handbook of Guidelines and Field Survey Results* (NCEL Technical Note N-1674, August 1983, by T.T. Fu, PhD, and C. Semien.) The handbook provides information for a variety of users at different levels of management and operation. It contains background information on various sources of waste oil and pertinent information for public works officers and planners. There are procedures for operators who use waste oil as boiler fuel, including procedures for handling, preburning treatment, burning methods, equipment modifications, and operational requirements. The final portion of the report consists of a comprehensive survey of the potential for using waste oil and a compilation of the reported experience of waste oil users.

The survey indicated that approximately 24 percent of the total energy consumed by Naval shore activities is in the form of fuel oil. The authors estimate that, on a Navy-wide basis, Naval activities may substitute waste oils for at least 6 percent of the total fuel oil requirements. Burning waste oil requires only minimal, low-cost modifications to boiler burners. Costs to separate burnable waste oil from those oils not recommended for burning are also low. Given the increasing cost of new fuel oil, the low investment cost to burn waste oil, and the slow but steady diminution of the supply of all fossil fuels, this effort shows great promise for the future.


Readers interested in obtaining a copy of TN-1674 may do so by writing to the *Naval Civil Engineering Laboratory, Code L07, Port Hueneme, California 93043.* **FL**

# CORRECTION

In the last issue's article entitled: "Water in fuel: Its Hazards and How to Prevent It," photographic credits were incorrectly ascribed to Technical Sergeant Daniel Getto. The correct spelling of the photographer's name is "Cetto." We apologize for the error.

## MTMC Negotiations Extend Discount Car Rates

Thrifty Rent-A-Car will lower their rates in the compact and mid-size car categories and extend their discount rates in the compact and mid-size car categories to military dependents of active duty and retired military personnel. Military dependents must meet standard rental qualifications.

For additional information contact: *Mr. Tim Dorsey, Thrifty Rent-A-Car, 427 North Lee Street, Alexandria, Virginia 22314 (703-549-5804).*

These adjustments are a result of negotiations with the Military Traffic Management Command.

As a result of Military Traffic Management Command (MTMC) negotiations with the Hertz Corporation, effective 1 March, Hertz will extend their unlimited mileage flat rates for rental cars to active duty and retired military personnel and their dependent family members who possess a valid military identification card.

Dependents are not required to be accompanied by the sponsor to be eligible for the rates, but must otherwise meet Hertz driver qualification requirements, i.e., age limits, driver's license, credit card, etc.

For additional information, call Hertz in the D.C. metropolitan area at 683-5333 (toll free number: 800-336-2496).

## FIC Provides Guidance through Governmental Maze

Got a question about federal employment for military dependents, immigration and naturalization, social security, military retirement, or any other matter that comes under the control or supervision of the U.S. government?

Getting an answer might be as simple as a phone call.

The staff at a Federal Information Center (FIC) will answer your questions or steer you to a government agency that can. Operated by the General Services Administration, there's a nationwide network of FIC offices available through local phone service in more than 70 major cities.

A complete list of all centers and their telephone numbers is available on request from: *Consumer Information Center, Department 582L, Pueblo, Colorado 81009.*

## EAP Enhanced by Counseling and Referral Service

To assist employees whose work performance is being affected by personal problems, the DLA Administrative Support Center has added an on-site counseling and referral service to its Employee Assistance Program (EAP). The service became operational in February as a means to provide short-term counseling and referral to employees experiencing alcohol and drug-related problems or behavioral and emotional problems which are adversely affecting job performance.

This service is designed for individuals who voluntarily wish to seek assistance and supervisors who need advice on helping employees with problems. On-site counseling is completely confidential and will be provided at no cost to employees.

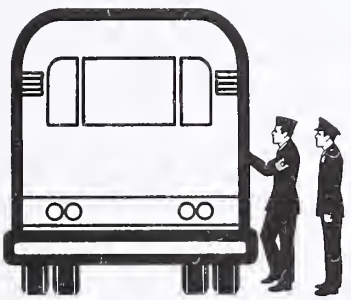
Dr. Ralph Surette, counseling psychologist, is available in Building 8, Room 8A310, 0800-1600, Tuesday and Thursday of each week. Appointments may be made by calling extension 46896.

## Cameron Station Express Service Provided

Beginning 12 March, during rush hours Metrobus will operate three EXPRESS route 21 F trips between the Pentagon Metrorail Station and Cameron Station. In the morning, three trips will leave from the Pentagon Metrobus Terminal Stop W at 0640, 0710, and 0740 and arrive at Cameron Station less than one-half hour later. In the evening, the buses will stop at all bus stops within Cameron Station beginning at 1615, 1645, and 1715 and arrive at the Pentagon Metrorail Station in less than

one-half hour.

The Metrobus fare from the Pentagon Station to Cameron Station is $1.05 each way. If you transfer from Metrorail in the morning, get a bus-to-rail transfer at your boarding station. It will be good for 25¢ off your morning bus fare.



## CHAMPUS Ombudsman Available

Where can one go to solve CHAMPUS problems when it seems everything has been tried to no avail?

Try the ombudsman for the Civilian Health and Medical Program for the Uniformed Services.

He's Air Force Senior Master Sergeant Walt Kane, the advocate for CHAMPUS families who need help with a problem.

"The ombudsman is not a replacement for the regional CHAMPUS claims processor, or the health benefits advisors at the various military activities," Sergeant Kane said. "Exceptional cases that have gone through all other avenues of assistance are the ones I want to hear about."

To reach Sergeant Kane, write: *OCHAMPUS/DO, Ombudsman, Aurora, Colorado 80045.*

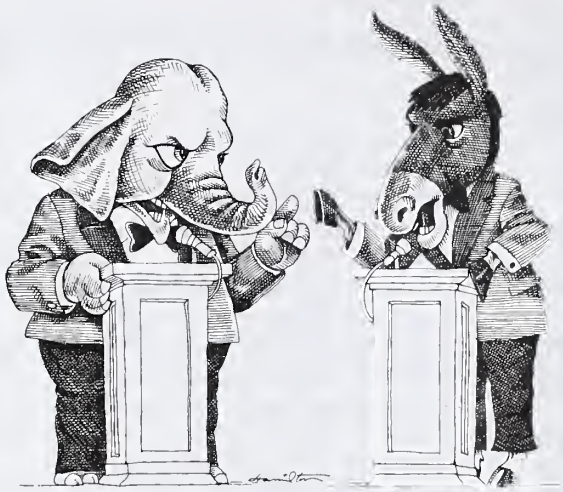
## Passports to Cost More, be Valid Longer

There's some good news and bad news about passports.

Military families going on overseas tours will find that the price of a new passport has risen from $10 to $35 for adults and $20 for children under 18 years. Beyond that, there is still a $7 execution fee for each passport.

Current passports remain good until their expiration dates, however, and the new adult passports are valid for 10 years (previously, 5). Passports for children whose faces change more over a decade, will remain valid for 5 years.

And, being machine readable, the new passports may get you through customs lines faster, according to the U.S. State Department.



# THE HATCH ACT:

## Know Voting Dos and Don'ts

Federal employees in the executive branch of the government are protected by law from efforts to force them to give political service or tribute. This was not always true. Federal employees got this protection from the Civil Service Act passed in 1883, which laid the foundations for the federal merit system.

The Hatch Act, passed in 1939, goes further than the Civil Service Act. It provides in general that federal employees cannot take an active part in political management or in political campaigns—even if they are willing to do so. However, the Hatch Act does permit political activity in regard to non-partisan elections.

### WHO IS COVERED

In general, employees in the executive branch of the federal government, whether in the competitive or excepted service, and employees of the District of Columbia government are subject to political activity restrictions. Part-time and temporary employees are included.

A few exemptions are made, including employees paid from the appropriation for the Office of the President, heads and assistant heads of executive or military departments, and officials who determine national policy, and who are appointed by the President subject to Senate confirmation. There is a partial exemption for federal employees living in the immediate vicinity of Washington, D.C., and in other communities where the majority of voters are employed by the federal government.

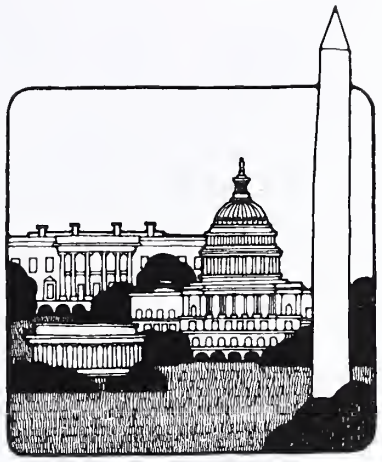
Some state and local government employees are also subject to less severe political activity restrictions. They are employees whose principal employment is in connection with an activity financed in whole or in part by federal funds.

### WHAT EMPLOYEES MAY DO

These are some permissible activities:

- You have the right to register and

*"The general prohibitions on federal employees are that they may not use their official authority or influence to interfere with or affect the result of an election, and that they may not take an active part in partisan political management or in partisan political campaigns."*



vote as you choose in any election.

- You have the right to express your opinions as an individual, privately and publicly, on all political subjects and candidates as long as you don't take an active part in partisan political campaigns.
- You may wear a political badge or button or display a political sticker on your automobile, subject to work-related limitations.
- You may be politically active in connection with an issue not specifically identified with a political party, such as a constitutional amendment, referendum, approval or a municipal ordinance, or similar issue.
- You may participate in the nonpartisan activities of a civic, community, social, labor, professional or similar organization.
- You may be a member of a political party or other political organization and attend meetings and vote on issues, but you may not take an active part in managing the organization.
- You may attend a political rally, convention, fund-raising function or other political gathering, but you may not take an active part in managing or conducting such gatherings.
- You may sign petitions, including nominating petitions, but may not initiate them or canvass for signatures if they are nominating petitions for candidates in partisan elections.
- You may petition Congress, or any member of Congress, such as by writing to your representatives and senators to say how you think they should vote on a particular issue.

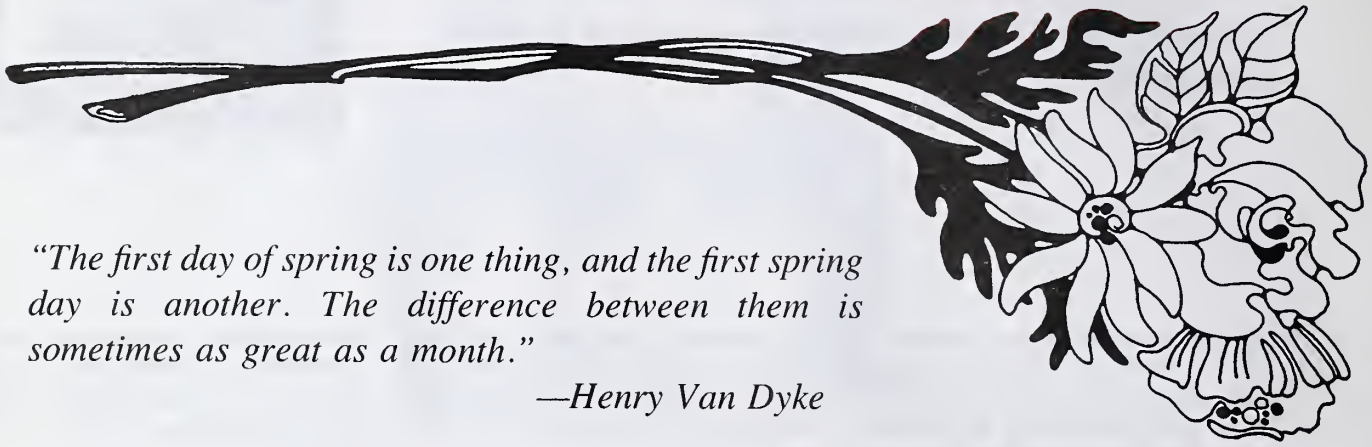
**WHAT EMPLOYEES MAY NOT DO**

The general prohibitions of federal employees are that they may not use their official authority or influence to interfere with or affect the result of an election, and that they may not take an active part in partisan political management or in partisan political campaigns. These are some of the prohibited activities:

- You may not be a candidate for nomination or election to a national or state office.
- You may not become a partisan candidate for nomination or election to public office.
- You may not campaign for or against a political party or candidate in a partisan election for public office or political party office.
- You may not serve as an officer of a political party, a member of a national, state, or local committee of a political party, an officer or member of a committee of a partisan club, or be a candidate for any of these positions.
- You may not participate in the organizing or reorganizing of a political party, organization or club.
- You may not solicit, receive, collect, handle, disburse, or account for assessments, contributions, or other funds for a partisan political purpose or in connection with a partisan election.
- You may not sell tickets for, or otherwise actively promote, such activities as political dinners.
- You may not take an active part in managing the political campaign of a candidate in a partisan election for public office or political party office.
- You may not work at the polls on behalf of a partisan candidate or political party by acting as a checker, challenger, or watcher, or in a similar partisan position.
- You may not distribute campaign material.
- You may not serve as a delegate, alternate, or proxy to a political party convention.
- You may not address a convention, rally, caucus, or similar gathering of a political party in support of or in opposition to a candidate for public office or political party office, or on a partisan political question.
- You may not endorse or oppose a candidate in a partisan election through a political advertisement, broadcast, campaign literature, or similar material.
- You may not use your automobile to drive voters to the polls on behalf of a political party or candidate in a partisan election.

**FL**

FLARE



*"The first day of spring is one thing, and the first spring day is another. The difference between them is sometimes as great as a month."*

*—Henry Van Dyke*

**DFSC-AP**

DEFENSE LOGISTICS AGENCY
DEFENSE FUEL SUPPLY CENTER
CAMERON STATION
ALEXANDRIA, VIRGINIA 22314

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

THIRD CLASS MAIL
POSTAGE & FEES PAID
DEFENSE LOGISTICS AGENCY
PERMIT No. G-53

☆U.S. GOVERNMENT PRINTING OFFICE: 1984 421 521 10004